

WE CLAIM:

1. A method of using the wait time (t_w) between transmission of successive packets of known packet size (P) of a content to be transmitted to achieve a target bandwidth (B_T) during the transmission comprising the steps of:

selecting a target bandwidth (B_T) sought to be achieved during the transmission;

computing a wait time (t_w) between successive packets of the transmission using the algorithm

$$t_w = \frac{P}{B_T} \quad ; \text{ and}$$

controlling the transmission of the packets using the wait time.

2. The method as claimed in claim 1 wherein the computed wait time t_w that is used is rounded to a time unit.

3. The method as claimed in claim 2 wherein the rounding to the time unit is accomplished by a counter.

4. The method as claimed in claim 1 further comprising the step

of:

determining the start time t_1 of transmission of a packet;

determining the end time t_2 of transmission of the packet, and

determining the time used t_{used} in transmitting the packet as $t_2 - t_1$.

5. The method as claimed in claim 4 further comprising the steps

of:

(a) determining the time used (t_{used}) in the transmission of a packet;

(b) determining a residual time (t) as $t_{used} - t_w$;

(c) waiting the time t between the end of transmission of one packet to the start of transmission of the next packet.

6. The method as claimed in claim 5 further comprising the step of repeating steps (a), (b) and (c) for each packet transmitted.

7. A method as in claim 5 wherein the residual time t is controlled

by:

determining a value of start time t_{start} , of sending a packet a current time t_{now} ;

performing a loop operation of:

(a) computing a time $t_{\text{elapsed}} = t_{\text{now}} - t_{\text{start}}$,

(b) comparing t_{elapsed} to the residual time t and transmitting the next packet when the value of $t_{\text{elapsed}} \geq t$.

8. The method as claimed in claim 7 further comprising the steps of computing an error value $\delta = t_{\text{elapsed}} - t$ and subtracting the value δ from a later supplied value of t .

9. A method as in claim 5 wherein the computed wait time t_w that is used is rounded to a time unit.

10. A method as in claim 9 wherein the rounding to the time unit is accomplished by a counter.

11. The method of claim 1, including the additional step of selecting the known packet size (P) of the packets to be transmitted.

12. The method of claim 1 wherein the known packet size (P) is provided by an application.

13. Apparatus for using the wait time (t_w) between transmission of successive packets of a content to be transmitted to achieve a target bandwidth B_T during the transmission comprising:

a computer including

a program to control transmission of a content in packets of data;

means to input and receive parameters of the size (P) of the packets to be transmitted and of the desired target bandwidth (B_T);

processing means to calculate a wait time (t_w) between successive packets of the transmission using the algorithm

$$t_w = \frac{P}{B_T} \quad \text{and}$$

control means to successively transmit the packets with the wait time t_w between the packets.

14. Apparatus as in claim 13 wherein said computer further comprises:

means for determining the start time (t_1) of transmission of a packet;

means for determining the end time (t_2) of transmission of the packet,

and

means for determining the time used (t_{used}) in transmitting the packet

as $t_2 - t_1$.

15. Apparatus as in claim 14 wherein said computer further comprises:

first means for determining the time used (t_{used}) in the transmission of a packet;

second means for determining a residual time t as $t_w - t_{used}$; and

wherein said control means operates to wait the residual time t between the start of transmission of one packet to the start of transmission of the next packet.

16. Apparatus as in claim 15 wherein said first and second determining means operates to determine the residual time t for each packet transmitted and said control means operates to wait the residual time t between the start of transmission of one packet to the start of transmission of the next packet.

17. Apparatus as in claim 16 further comprising means for controlling the residual time t by

determining a value of start time t_{start} , and a current time t_{now}

performing a loop operation of:

(a) computing a time $t_{elapsed} = t_{now} - t_{start}$, and

(b) comparing t_{elapsed} to the residual time t and transmitting the next packet when the value of $t_{\text{elapsed}} \geq t$.

18. Apparatus as in claim 17 further comprising means for computing an error value $\delta = t_{\text{elapsed}} - t$ and subtracting the value δ from a later supplied value of t .

19. Apparatus as in claim 13 wherein said control means further comprises a counter that operates on a periodic basis to measure the wait time t_w .

20. Apparatus as in claim 13 wherein said computer operates said control means to compute the wait time t_w based on other measured times.